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**REMARKS**

Claims 1-10 and 21-30 are all the claims pending in the application. Claims 21-30 are added, above, to further define the invention. Claims 1-10 stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion.

**I. The Prior Art Rejections**

Claims 1, 5-7, 8, and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by Endo et al. (JP 11-31446) hereinafter "Endo". Claims 1-4 stand rejected under 35 U.S.C. §102(b) as being anticipated by Clinton et al. (US Patent No. 6,055,150) hereinafter "Clinton". Claims 1, 5, 6, 8 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by Ishikawa et al. (JP 2000-243200) hereinafter "Ishikawa". Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Endo in view of Clinton. Applicants respectfully traverse these rejections based on the following discussion.

**A. The Rejection Based on Endo et al.****1. The Position in the Office Action**

With respect to the rejection of claims 1 and 5-7, the Office Action states that Endo discloses in Figure 8, a fuse structure comprising an insulator layer 45 or comprising an interface wall wherein said interface wall further comprises a first side wall, a second side wall, and an inner wall, wherein said inner wall is disposed within a gap (as in claim 7); a plurality of fuse electrodes or fuse electrodes diametrically opposed to one another (as in claim 5) extending through said insulator layer to an underlying wiring layer 46; and a fuse element perpendicularly

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disposed above said plurality of fuse electrodes (as in claim 6) and connected to said electrodes, wherein said fuse element is positioned external to said insulator, with a gap juxtaposed between said insulator and said fuse element.

With respect to the rejection of claims 8 and 10, the Office Action states that Endo discloses in Figure 8 a fuse structure comprising an insulator layer or comprising an interface wall, wherein said interface wall further comprises a first side wall, a second side wall, and an inner wall (as in claim 10); a plurality of fuse electrodes extending through said insulator layer to an underlying wiring layer; and a fuse element connected to said electrodes, wherein said fuse element is positioned external to said insulator, wherein said fuse element is perpendicularly disposed above said plurality of fuse electrodes, wherein said fuse electrodes are diametrically opposed to one another.

## 2. The Endo Reference

Endo discloses a way to easily detect temperature rise of a wire harness by arranging a temperature fuse in a wire harness or adjacent to the wire harness, and detecting existence of disconnection of the temperature fuse. In the case where a wire harness 10 is normal, current flows in a coil 15a of an electromagnetic relay 15, a wire 14 and temperature fuses 12a-12d, and a terminal board 15b maintains the off condition. When a rare short-circuit is generated in the wire harness 10 and the temperature rises, the temperature fuse is disconnected at this position, and the current does not flow in the coil 15b, the wire 14 and the temperature fuses 12a-12d, and the terminal board 15b is turned on. At this stage, voltage from a voltage applying circuit 16 is applied to an alarm lamp 17 so as to light the alarm lamp 17. With this structure, temperature rise of the wire harness 10 more than the predetermined temperature is informed to a user, and the wire harness 10 is exchanged with a new one so as to previously avoid the generation of deterioration.

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### 3. Applicants' Response

Endo does not disclose electrodes extending through an insulator layer as defined by independent claims 1 and 8. To the contrary, the wiring layer 46 shown in Figure 8 of Endo is not protected by an insulator layer in the location of the fuse 12. To the contrary, both the fuse 12 and the wiring layer 46 are exposed to the external environment.

This is fundamentally different than the claimed invention that includes "fuse electrodes extending through said insulator layer to an underlying wiring layer" as defined by independent claims 1 and 8. No portion of the fuse 12 in Endo passes through any type of insulator. Further, there is no "underlying wiring layer" in Endo. To the contrary, the wiring layer 46 shown in Figure 8 of Endo cannot be classified as an underlying layer because there is no insulator in the region of the fuse.

Thus, as shown above, Endo does not teach or suggest many features of the claimed structure defined by independent claims 1 and 8. Therefore, independent claims 1 and 8 are patentable over Endo. Further, dependent claims 5-7 and 10 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define.

### B. The Rejection Based on Clinton

#### 1. The Position in the Office Action

With respect to the rejection of claims 1-4, the Office Action states that Clinton discloses a fuse structure comprising an insulator layer 30; a plurality of fuse electrodes 25 extending through said insulator layer to an underlying wiring layer; and a fuse element 50 or electroplated fuse element (as in claim 2) or electroless plated fuse element (as in claim 4) and connected to said electrodes, wherein said fuse element is positioned external to said insulator, with a gap juxtaposed between said insulator and said fuse element.

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## 2. The Clinton Reference

Clinton discloses a failure resistant electrostatic chuck 20 for holding a substrate 35 during processing of the substrate 35 that comprises one or more electrodes 25 covered by an insulator 30, the electrodes 25 being capable of electrostatically holding a substrate 35 when a voltage is applied thereto. An electrical power bus 40 comprises one or more output terminals 45 that conduct voltage to the electrodes 25. The fuses 50 are positioned in hollow cavities 55 in the insulator 30, and electrically connect the electrodes 25 in series to the output terminals 45 of the power bus 40. Each fuse 50 can electrically disconnect an electrode 25 from an output terminal 45 when the insulator 30 covering the electrode 25 punctures and exposes the electrode 25 to a plasma process environment thereby causing a plasma current discharge to flow through the fuse 50.

## 3. Applicants' Response

Clinton does not teach or suggest that the "fuse element is positioned external to said insulator" as defined by independent claim 1. To the contrary, Clinton requires that the "fuses 50 are positioned in hollow cavities in the insulator 30" (Abstract, lines 8-10). Therefore, Clinton explicitly requires that the fuse element be positioned within the insulator 30. The invention is fundamentally different than the structure shown in Clinton and has the fuse element position external to the insulator.

Further, Clinton does not teach "fuse electrodes extending through said insulator layer to an underlying wiring layer" as defined by independent claim 1. To the contrary, the only electrodes connected to the fuse elements in Clinton extend to wiring layers within the insulator and not to an "underlying wiring layer" as required by Applicants' claims.

Therefore, as shown above, Clinton is deficient in teaching a number of features defined by independent claim 1 and independent claim 1 is patentable over Clinton. Further, dependent

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claims 2-4 are similarly patentable. In view the forgoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

### **C. The Rejection Based on Ishikawa**

#### **1. The Position in the Office Action**

With respect to the rejection of claims 1, 5 and 6, the Office Action states that Ishikawa discloses, in Figures 1-3 and 6-9, a fuse structure comprising an insulator layer; a plurality of fuse electrodes 32a, 32b or fuse electrodes diametrically opposed to one another (as in claim 5) extending through said insulator layer to an underlying wiring layer; and a fuse element 30 perpendicularly disposed above said plurality of fuse electrodes (as in claim 6) and connected to said electrodes, wherein said fuse element is positioned external to said insulator, with a gap juxtaposed between said insulator and said fuse element.

With respect to the rejection of claims 8 and 10, the Office Action states that Ishikawa discloses, in Figures 1-3 and 6-9, a fuse structure comprising an insulator layer or comprising an interface wall, wherein said interface wall further comprises a first side wall, a second side wall, and an inner wall (as in claim 10); a plurality of fuse electrodes 32a, 32b extending through said insulator layer to an underlying wiring layer; and a fuse element connected to said electrodes, wherein said fuse element is positioned external to said insulator, wherein said fuse element is perpendicularly disposed above said plurality of fuse electrodes, wherein said fuse electrodes are diametrically opposed to one another.

#### **2. The Ishikawa Reference**

Ishikawa discloses an invention to prevent an accident by means of a thermal fuse when an overcurrent protection element is anomalously overheated. This safety device is equipped with a PTC element (overcurrent protection element) or a first protection means for protecting an

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electric circuit from an overcurrent, and a thermal fuse 30 or a second protection means provided near the PTC element and made up of a first electrode 31a and a conductor pattern 31 connected to the PTC element, a second electrode 32a of a conductor pattern 32 insulated by a gap 33, and solder 34 bridging the two electrodes and separated into the two on both the electrode sides by being melted by the heat of the PTC element. Or, a through hole in a circuit board is filled with solder, the solder is adapted to form a recessed part on one opening side of the through hole and a projecting part on the other opening side, and the projecting part can bridge the two electrodes. The inner diameter of the through hole is larger than the plate thickness of the circuit board. The outer diameter of an exposed conductor part on the recessed part side of the circuit board can be made larger than the outer diameter of the second electrode. The circuit board is disposed vertically or with the projecting part up.

### 3. Applicants' Response

Ishikawa does not teach or suggest that the "a fuse element is positioned external to said insulator, with a gap juxtaposed between said insulator and said fuse element" as defined by independent claims 1 and 8. To the contrary, Ishikawa utilizes a solder bump 30 that is formed directly on the external portion 10B of the insulator 10 as a fuse element. The solder bump 30 is in direct contact with the insulator 10B and therefore cannot be "external to said insulator" as required by independent claims 1 and 8. Further, because the solder bump 30 is positioned directly on the insulator 10B, there cannot be "a gap juxtaposed between said insulator and said fuse element" as required by independent claims 1 and 8.

Since Ishikawa does not teach or suggest many features defined by independent claims 1 and 8, Applicants respectfully submit that independent claims 1 and 8 are patentable over Ishikawa. Further, dependent claims 5, 6, and 10 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

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**D. The Rejection Based on Endo in view of Clinton**

**1. The Position in the Office Action**

With respect to the rejection of claim 9, the Office Action states that Endo discloses all the claimed subject matter, but does not specifically disclose an electroplated and electroless fuse element. The Office Action contends that Clinton discloses an electroplated and electroless fuse element. The Office Action concludes that, therefore, it would have been obvious to one skilled in the art at the time the invention was made to use an electroplated and electroless fuse element, since that would provide the required resistivity and melting point necessary for a better fuse function.

**2. Applicants' Response**

With respect to the proposed combination of Endo and Clinton, Applicants respectfully submit that Endo and Clinton teach directly away from the claimed invention and that it would not have been obvious to combine the references. Teaching way shows strong evidence that the references would not have been combined by one ordinarily skilled in the art.

Clinton teaches away from the claimed invention by requiring that the fuse be internal to the structure. Endo teaches away by requiring that the fuse be connected to wiring that is on the external portion of the structure. Given these teachings that are directly contrary to the claimed invention (as shown above), one ordinarily skilled in the art would not have been motivated by these references to arrive the claimed invention. In view of the forgoing, Applicants respectfully submit that the Office Action does not set forth the prima facie case of obviousness. Therefore, the rejection is defective upon its face and should be removed.

Further, as shown above, neither Endo nor Clinton teach or suggest the invention as defined by independent claim 8. Therefore, independent claim 8 is patentable over Endo and Clinton (alone or combined). Further, dependent claim 9 is similarly patentable, not only by

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virtue of its dependency from patentable claim 8, but also by virtue of the additional features of the invention defines. In view the forgoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

### III. Formal Matters and Conclusion

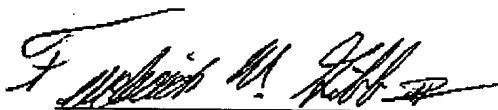
In view of the foregoing, Applicants submit that claims 1-10 and 21-30, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0458.

Respectfully submitted,

Dated: 9/5/02

  
Frederick W. Gibb, III  
Reg. No. 37,629

McGinn & Gibb, P.C.  
2568-A Riva Road  
Suite 304  
Annapolis, MD 21401  
Customer Number: 29154

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**Marked Up Version of Changes Made:**

**Please add the following new claims:**

21. The fuse structure in claim 1, wherein said fuse element is surrounded by air.
22. The fuse structure in claim 8, wherein said fuse element is surrounded by air.
23. The fuse structure in claim 1, wherein said electrodes and said fuse element form a U-shaped structure.
24. The fuse structure in claim 8, wherein said electrodes and said fuse element form a U-shaped structure.
25. An integrated circuit structure comprising:
  - a wiring layer having wiring elements;
  - an insulator layer covering said wiring layer;
  - electrodes extending completely through said insulator layer and being connected to said wiring elements; and
  - a fuse element connected to said electrodes,wherein said insulator layer forms an external surface of said integrated circuit structure and said electrodes extend beyond said external surface, and  
wherein said fuse element is connected only to said electrodes and is maintained external to said integrated circuit structure by said electrodes.
26. The integrated circuit structure in claim 25, wherein said electrodes and said fuse element form a U-shaped structure.

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27. The integrated circuit structure in claim 25, wherein said electrodes electrically connect said wiring elements to said fuse element.
28. The integrated circuit structure in claim 25, wherein said fuse completes a circuit comprising said wiring elements, said electrodes, and said fuse element.
29. The integrated circuit structure in claim 25, wherein said wiring elements are internal to said integrated circuit structure and are separated from an external portion of said integrated circuit structure by said insulator layer.
30. The integrated circuit structure in claim 25, wherein said fuse element is plated.